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NORTH CAROLINA
AGRICULTURAL EXPERIMENT STATION

CONDUCTED JOINTLY BY THE

STATE DEPARTMENT OF AGRICULTURE

AND THE

**NORTH CAROLINA STATE COLLEGE OF
AGRICULTURE AND ENGINEERING**

RALEIGH AND WEST RALEIGH

DIVISION OF AGRONOMY

**HARVESTING TOBACCO BY PRIMING OR
PICKING THE LEAVES AS COMPARED
WITH CUTTING THE STALKS**

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1In cooperation with the U. S. Department of Agriculture, Bureau of Plant Industry.

2In cooperation with the U. S. Department of Agriculture, Bureau of Soils.

3In cooperation with the U. S. Department of Agriculture, Bureau of Animal Industry.

4In cooperation with the U. S. Department of Agriculture, Office of Public Roads and Rural Engineering.

HARVESTING TOBACCO BY PRIMING OR PICKING THE LEAVES AS COMPARED WITH CUTTING THE STALKS

BY E. G. MOSS.¹

For the past several years there has been considerable discussion as to the relative merits of harvesting tobacco by cutting the stalk and by picking off or priming the leaves as they mature. In the new tobacco belt of the flue-cured district, the method of priming or picking the leaves came into general use rather promptly after it first made its appearance. The early adoption of this method was brought about largely by local conditions, the soils being very light and sandy on which the tobacco fired badly. Frequently from one-fourth to one-half the plant would be wasted in the field before the top of the plant was ripe enough to cut, resulting in poor crops, perhaps, four out of five years. Under these conditions tobacco was an unprofitable crop except in years of relatively high prices and very favorable seasons. It was soon realized that in order to save all the leaves they must be harvested by picking as soon as they reached the proper maturity. This was done by priming the leaves off as fast as they matured. From that time, tobacco growing in the New Belt began to increase and with the increased demand for bright flue-cured tobacco, especially of the smoking types, tobacco came to be a fairly stable and profitable crop.

This change of method of harvesting took place without the growers having realized that the gain from the new process amounted to anything more than the actual saving of the leaves that previously had been lost in the field by firing, and allowing all the leaves on the plant to mature.

In the Old Belt where the soils are heavier and there is consequently less tendency for the bottom leaves of the plant to fire while the upper leaves are maturing, the growers have continued the method of harvesting the crop by cutting the stalks. Under these conditions the new method of harvesting seemed less necessary, especially so long as the profitableness of the crop depended chiefly on the percentage of wrappers obtained.

Market demands for the last few years, however, have undergone a material change, brought about by the large increase in the consumption of smoking tobacco, especially in the form of cigarette and granulated smoking tobacco, with a relatively small increase in the demand for plug tobacco, and therefore, flue-cured wrappers. Furthermore, even in the Old Belt there are serious losses of lower leaves from firing when seasons are unfavorable and, as a matter of fact, there is more or less loss every year.

¹In accordance with an agreement between the North Carolina Department of Agriculture and the Bureau of Plant Industry of the United States Department of Agriculture, this bulletin has been prepared by E. G. Moss of the Federal and State Departments.

As the demand for bright smoking tobacco increased it became more apparent that a thorough test of the two methods of harvesting the crop should be made in the Old Belt, both as to actual merits of the methods and the relative profitableness to the farmer.

The U. S. Department of Agriculture in coöperation with the Division of Agronomy of the N. C. Department of Agriculture, began this experiment at the tobacco station, near Oxford, in Granville County, in 1913.¹

PLAN OF THE EXPERIMENT

Fields of definite size with rows of uniform length and with an even number of rows were used in the tests. The tobacco from alternate pairs of rows was primed and, from the others, was cut. The fields selected were as nearly uniform as could be had on the Station, and were fertilized alike every year. By priming each alternate pair of rows through the field and cutting the others, any irregularity in fertility that might show up in the field is overcome, and by this means larger plats were obtained. The soil was an average tobacco soil, mapped as Durham Sandy Loam, and would yield from five hundred to seven hundred pounds of tobacco per acre with a normal application of tobacco fertilizer, say 800 lbs. analyzing 3-8-3.

The fertilizer used in these experiments for the four years 1913 to 1916, inclusive, was,

250 lbs. Dried Blood containing 16 per cent Ammonia.

400 lbs. Acid Phosphate containing 16 per cent Phosphoric Acid.

160 lbs. Sulphate Potash containing 50 per cent Potash.

Total 810 lbs. per acre each year.

In 1913, two to three bottom leaves were primed off and thrown away when the tobacco was topped and all the tobacco was topped to about ten to twelve leaves. This was done in order to get the actual difference in weight and value between the leaves harvested by priming and those harvested by cutting the stalk, without otherwise changing the cultural methods. This, however, is not what the grower would do in actual practice, since ordinarily tobacco for priming would be topped two to four leaves higher than for harvesting by cutting the stalks.

In 1913 the season was very favorable for tobacco and prices were high, while in 1914 the season was fairly good but market prices were low.

In 1915 the season was dry and hot and tobacco fired badly, especially for ten days in August, causing considerable loss on the tobacco

¹The author recognizes the work that had previously been done by T. L. Blalock and F. B. Carpenter under the direction of H. B. Battle, of the N. C. Experiment Station, and published in Bulletin No. 86, May 2, 1892. Also reference will be made to Farmers' Bulletin No. 523, "Tobacco Curing" by Dr. W. W. Garner, and to Bulletin No. 79, a professional paper on "Research Studies on the Curing of Leaf Tobacco" by W. W. Garner, C. W. Bacon and O. L. Foubert, of the U. S. Department of Agriculture.

that was to be cut. The tobacco from the primed rows was saved and there was a greater difference in yield and total value between the cut and the primed tobaccos than in any other year during the tests.

In 1916 considerable rain fell during the growing season — in June, 6.62 inches; in July, 4.58 inches; in August, 4.21 inches — and much of the tobacco was damaged by the excessive water in the soil. The tobacco that was cut, however, did not fire and the yield from both plats was very light, only 666 lbs. per acre from the primed and 487 lbs. from the cut. The quality of the primed tobacco in 1916 was not as good as that of the cut tobacco. This is partly accounted for, perhaps, by the fact that two curings were primed immediately after and during heavy rains. Because of the excessive rainfall it also seems probable that the plants topped higher for priming were unable to properly mature the greater number of leaves.

Table 1. Showing relative yields and values of tobacco harvested by priming the leaves and by cutting the stalk, Granville Branch Station, Oxford, N. C., 1913-1916.

Year of Experiment and Method of Harvesting	Yield Per Acre, Pounds	Average Price of Tobacco Per 100 Pounds	Value of Crop Per Acre
1913, Primed.....	812	\$ 30.50	\$ 247.66
Cut.....	752	26.42	198.09
1914, Primed.....	981	12.34	121.10
Cut.....	678	10.03	68.00
1915, Primed.....	1,172	13.46	157.81
Cut.....	752	10.03	75.47
1916, Primed.....	666	20.74	138.17
Cut.....	487	25.95	126.44
Four Year Average, Primed.....	907	18.29	166.18
Four Year Average, Cut.....	667	17.55	117.15
Average difference for four years in favor of priming.	240	.74	49.03

INCREASE IN YIELD FROM PRIMING METHOD

As will be seen from the table the difference in yield for 4 years in favor of priming is 240 lbs. per acre, or an increase of 36 per cent.

In 1913, as has been stated, the tobacco to be harvested by picking or priming the leaves was topped at the same height, from 10 to 12 leaves, as that to be cut, and before topping, the bottom leaves were primed off and thrown away as is the custom in the wrapper district of the Old Belt where the stalk is cut. This resulted in a relatively small increase in yield, only 60 lbs. per acre, or an increase of about 8 per cent, although the primed tobacco sold for \$48.97 more per acre than the cut, an increase in value of 25 per cent.

The increase in weight was less than was obtained by Garner in some curing experiments conducted in Connecticut with cigar leaf tobacco.¹

Quoting from this author: "When the leaves are cured on the stalk there is a further loss in weight from another cause. It has been pointed out that while the plant is growing in the field there is a movement of food materials from the leaves into the stalk, and exactly the same thing happens in the curing barn when the tobacco is harvested by cutting the stalk. When the leaves are primed, there is, of course, no chance for this movement from leaf to stalk to take place. The result is that leaves cured by priming are 10 to 12 per cent heavier than if cured on the stalk. It has also been found that if suckers are left on the stalk at the time of harvesting, there is a still greater loss of weight in curing the entire plant. But this is not all, for when the lower leaves are picked from the plant it causes those left on the stalk to increase in size and weight, so that altogether there is a gain in weight of fully 20 to 25 per cent when the tobacco is harvested by picking the leaves from the stalk."

In 1891 Blalock and Carpenter, of the N. C. Experiment Station, conducted some experiments near Oxford, in Granville County, to determine the relative merits of the two methods of harvesting tobacco.²

Their experiments show an increase in weight where the tobacco was primed over that harvested by cutting the stalk of 225 lbs. per acre or 39 per cent. The market conditions were such at that time as not to offer much inducement to the farmer to prime his tobacco even though a gain in weight could be obtained.

PROFITABLENESS OF THE PRIMING METHOD AS COMPARED WITH THE METHOD OF CUTTING THE STALK

Considerable care was used in handling the tobacco in the present experiment and the values for the cured leaf were obtained by grading out the tobacco in separate lots, that is, the primed and cut were graded separately. The tobacco for each year was sold on the market floors the same day and at the same warehouse, without the buyers having any information concerning the two plats until after the sales had been made. By referring to the table it will be seen that the average increase in value of the primed tobacco over the cut tobacco for 4 years was \$49.03 per acre. This does not take into consideration possible differences in the cost of harvesting, curing or handling the crop.

In these tests it is estimated that the average cost of harvesting an acre of tobacco by priming was \$12.79 or \$1.41 per hundred pounds of cured leaf for the average yield obtained, while the corresponding

¹Farmers' Bulletin No. 523, U. S. Dept. of Agriculture, "Tobacco Curing," by W. W. Garner.

²Bulletin No. 86, N. C. Agricultural Experiment Station, by T. L. Blalock and F. B. Carpenter.

figures for harvesting by cutting were \$9.08 per acre or \$1.36 per hundred pounds of cured leaf. If the same yields were obtained by the two methods these values would mean a difference of only 50 cents per acre for harvesting a crop of 1000 pounds.

This additional cost for picking, stringing and hanging the leaves in the barn is offset by a saving in fuel in curing primed tobacco and in the space required in the curing barn and in the pack house. It is estimated that one barn 18x18 feet will take care of about five acres of tobacco when primed while only three or four acres of cut tobacco could be handled in a barn of the same size. Correspondingly less bulking space is required in the pack house for primed tobacco. It seems safe to say, therefore, that there is little if any increase in the cost of harvesting and curing primed tobacco as compared with cut tobacco. On this basis the average increase in value of the primed tobacco, amounting to \$49.03 per acre, is practically a net gain.



Fig. 1, showing four-wheel truck extensively used in the New Belt for hauling leaves from field to barn

As regards the average price per pound of the primed leaf it will be seen from the table that in three years out of four the primed tobacco sold for considerably better prices than were obtained for the cut tobacco while, on the other hand, with the wet growing season of 1916 better prices were obtained for the cut tobacco. For the four years the primed leaf averaged somewhat higher in price than the cut tobacco. It is believed that only under very exceptional weather conditions during the growing season will cut tobacco bring better prices than primed leaf.

SPECIAL METHODS USED IN PRIMING

In some sections of the New Belt every eighth row is made a wide row for the truck to follow in hauling the leaves to the barn, but by using a sled, such as is shown in Fig. 2, this is not necessary, unless the tobacco rows are very narrow. At the tobacco station this sled is used exclusively for hauling the leaves from the field. When the rows are 3 feet 9 inches to 4 feet wide the sled can be operated between any of the rows without danger of breaking or bruising the tobacco left on stalks, unless the tobacco is unusually large and laps in the rows. This sled can be built for about 75 cents. It is 7 feet long by 20 inches wide and will hold twenty-five to thirty-five sticks of primed tobacco.



Fig. 2. Sled used at the tobacco station for hauling leaves from the field to the barn

Another important factor to be given due consideration in determining the method of harvesting the tobacco and one likely to play a more important part in the future of the tobacco farmer of the Old Belt is: by priming, somewhat more fertile land can be planted to tobacco and heavier applications of manure and fertilizer can be used without serious danger of producing coarse, bony tobacco with poor color. Hence, to-

bacco lands can be kept in a higher state of fertility, thereby producing more profitable crops of tobacco and also larger yields of other crops that should be grown in rotation on every tobacco farm.

SUMMARY

Market conditions in the flue-cured district have changed in the past few years. The demand for bright smoking tobaccos has increased more rapidly than for plug tobacco wrappers, consequently the grower should attempt to get the greatest possible yield of bright cutters and smokers.

Four years experiments have shown that the yield of tobacco can be materially increased by priming the leaves as they mature instead of by cutting the stalk. These tests indicate that an increase in yield of 25 to 35 per cent may be expected by priming.

The increase in value per acre from priming has averaged \$49.03 for the four years of the tests. This increase in value has been due mainly to increase in yield and to a lesser extent to better average colors.

The tobacco land can be maintained in a higher state of fertility when tobacco is to be primed, without serious danger of damaging the quality of the cured leaf.

For priming tobacco the plant ordinarily should be topped two to four leaves higher than for cutting. On rich land it may be topped four to six leaves higher.

Less barn room, storage room and fuel are required per pound of cured leaf when the crop is primed than when it is cut.

